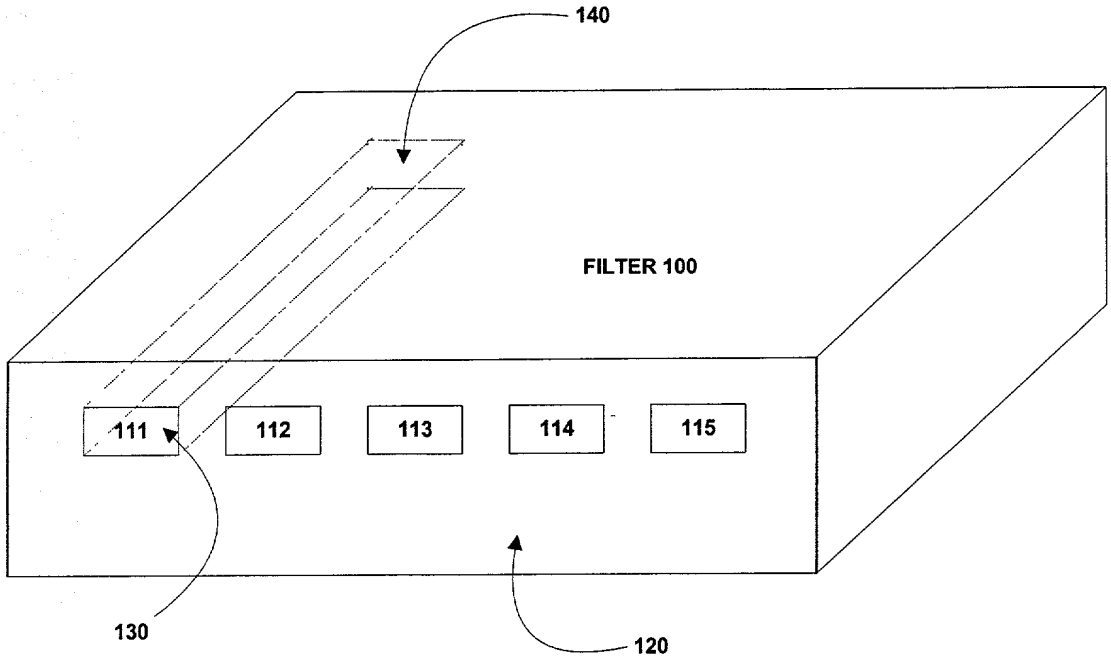


FIGURE 1

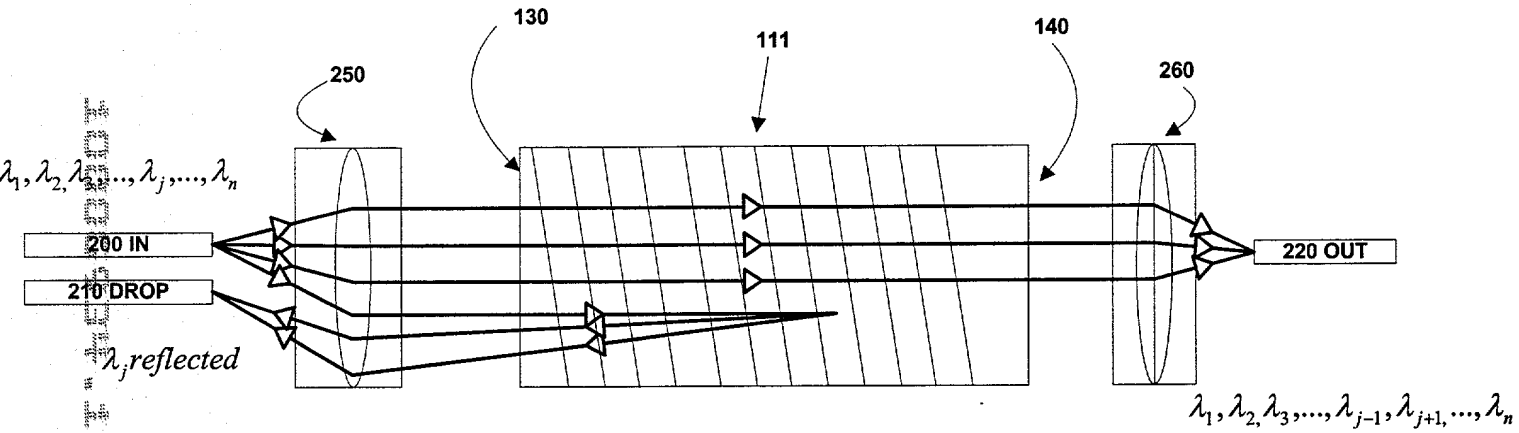

130
111
140
250
260
$\lambda_1, \lambda_2, \lambda_3, .., \lambda_j, ..., \lambda_n$
200 IN
210 DROP
λ_j reflected
220 OUT
$\lambda_1, \lambda_2, \lambda_3, ..., \lambda_{j-1}, \lambda_{j+1}, ..., \lambda_n$

FIGURE 2

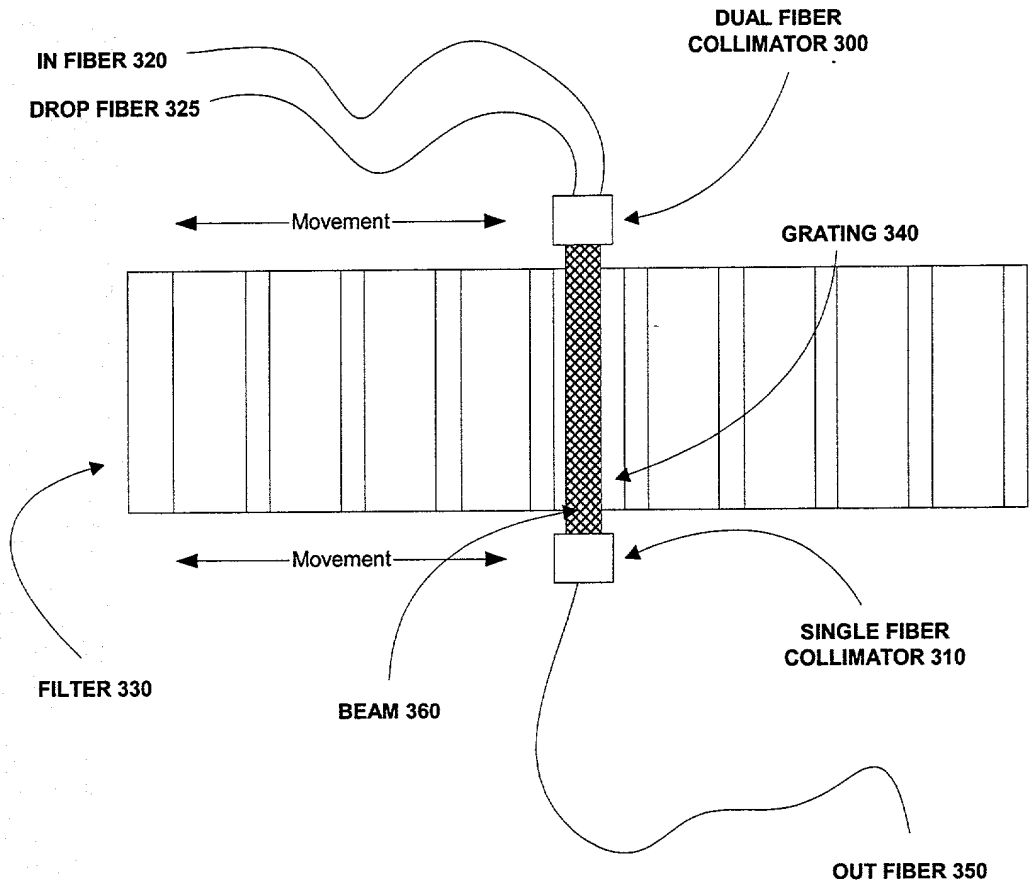

DUAL FIBER
COLLIMATOR 300
IN FIBER 320
DROP FIBER 325
Movement
GRATING 340
Movement
FILTER 330
BEAM 360
SINGLE FIBER
COLLIMATOR 310
OUT FIBER 350

FIGURE 3

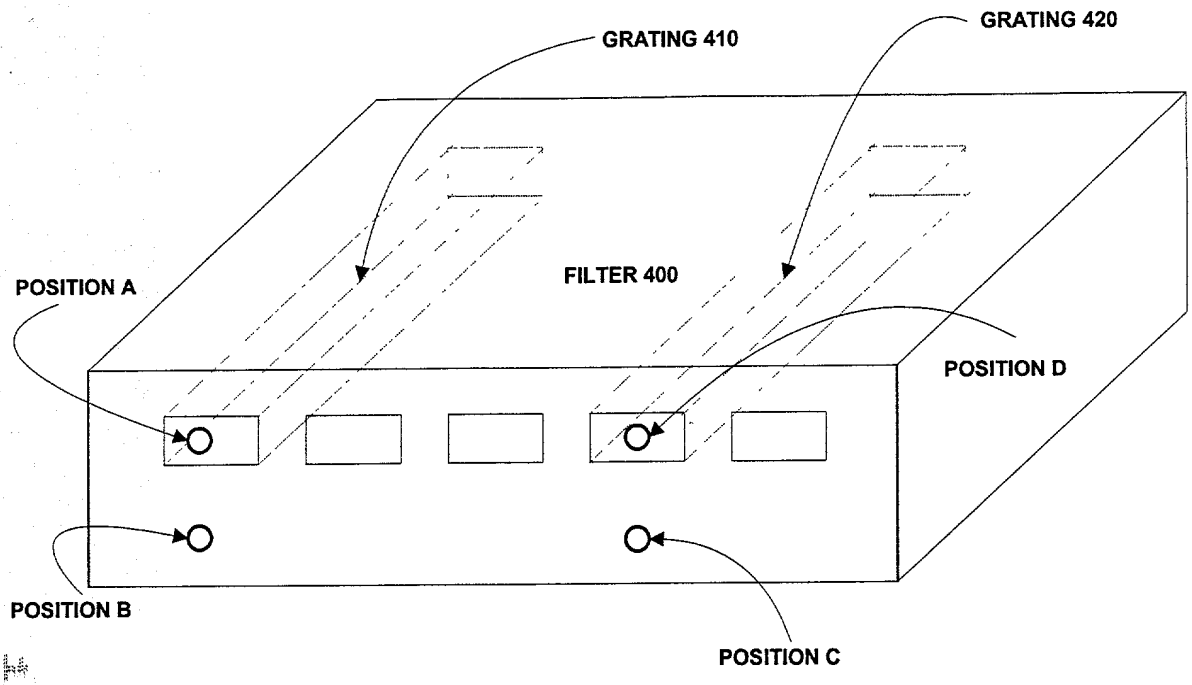

GRATING 410
GRATING 420
FILTER 400
POSITION A
POSITION B
POSITION C
POSITION D

FIGURE 4

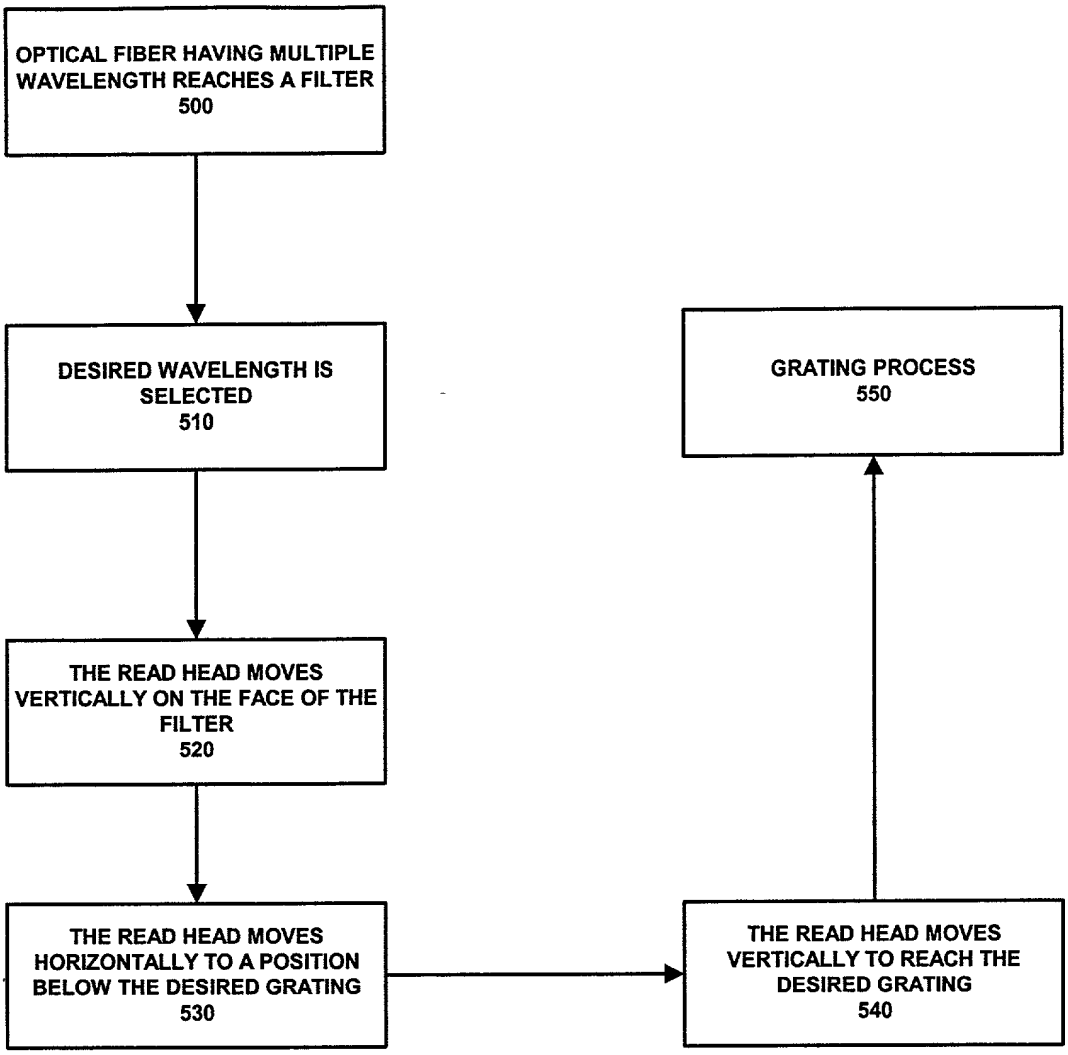

OPTICAL FIBER HAVING MULTIPLE WAVELENGTH REACHES A FILTER
500
DESIRED WAVELENGTH IS SELECTED
510
THE READ HEAD MOVES VERTICALLY ON THE FACE OF THE FILTER
520
THE READ HEAD MOVES HORIZONTALLY TO A POSITION BELOW THE DESIRED GRATING
530
THE READ HEAD MOVES VERTICALLY TO REACH THE DESIRED GRATING
540
GRATING PROCESS
550

FIGURE 5

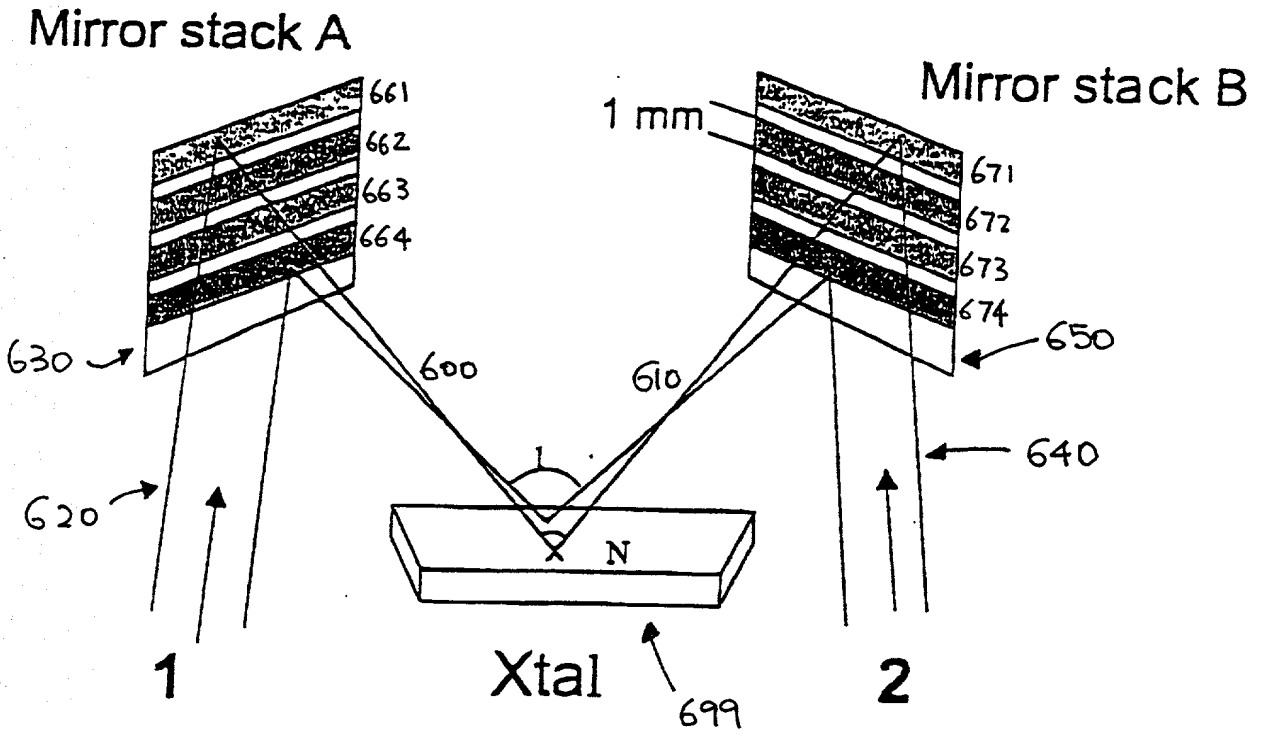

Mirror stack A
661
662
663
664
630
600
620
1
Xtal
699
1 mm
Mirror stack B
671
672
673
674
650
610
640
2
N

FIGURE 6

PHASE MASK METHOD

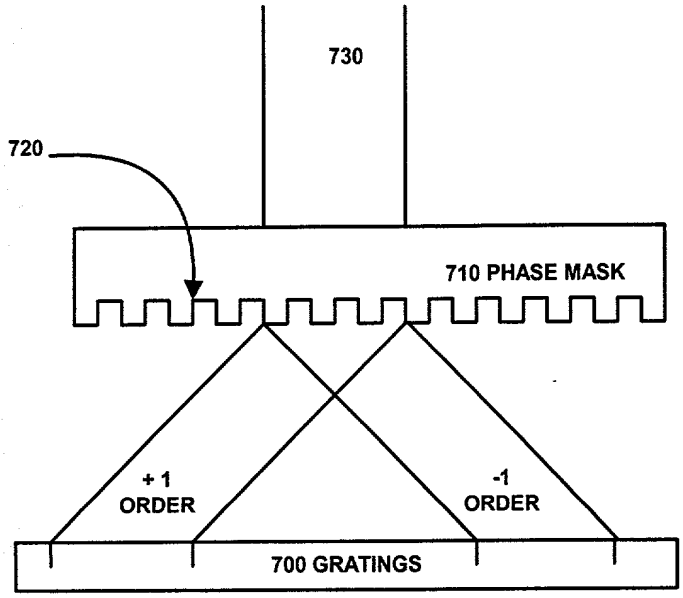
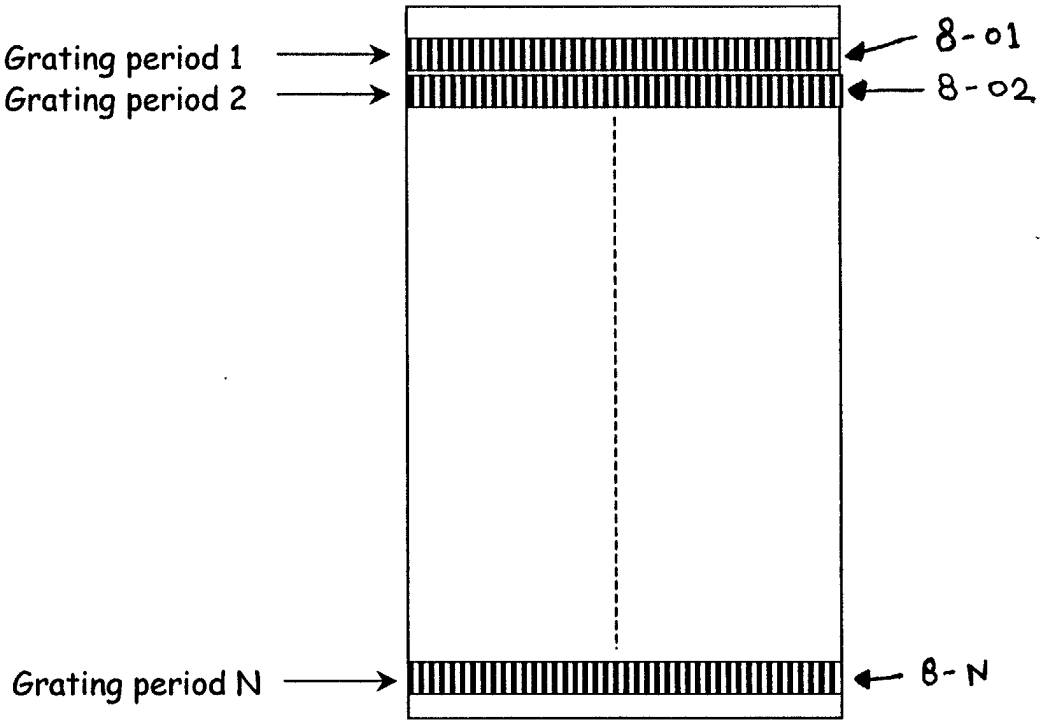


FIGURE 7

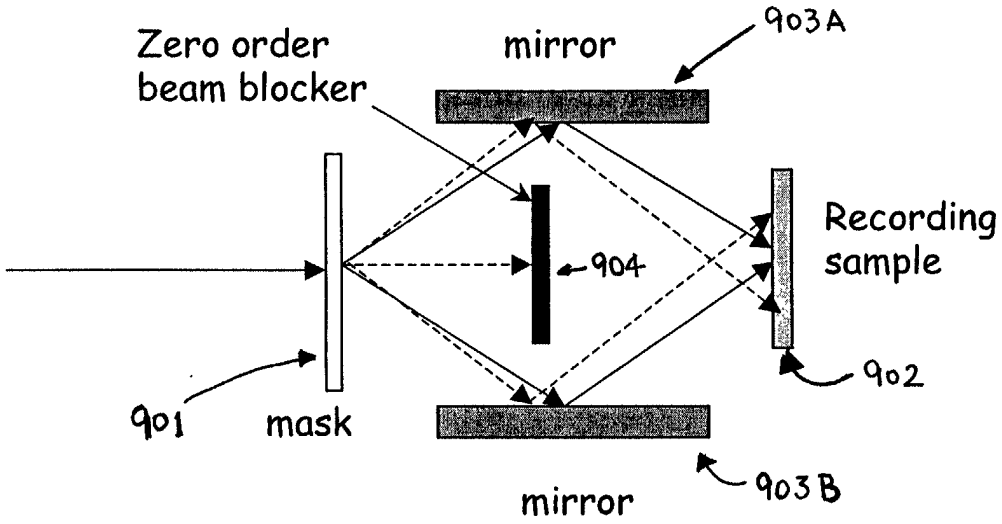
a



Phase mask Top view

FIGURE 8

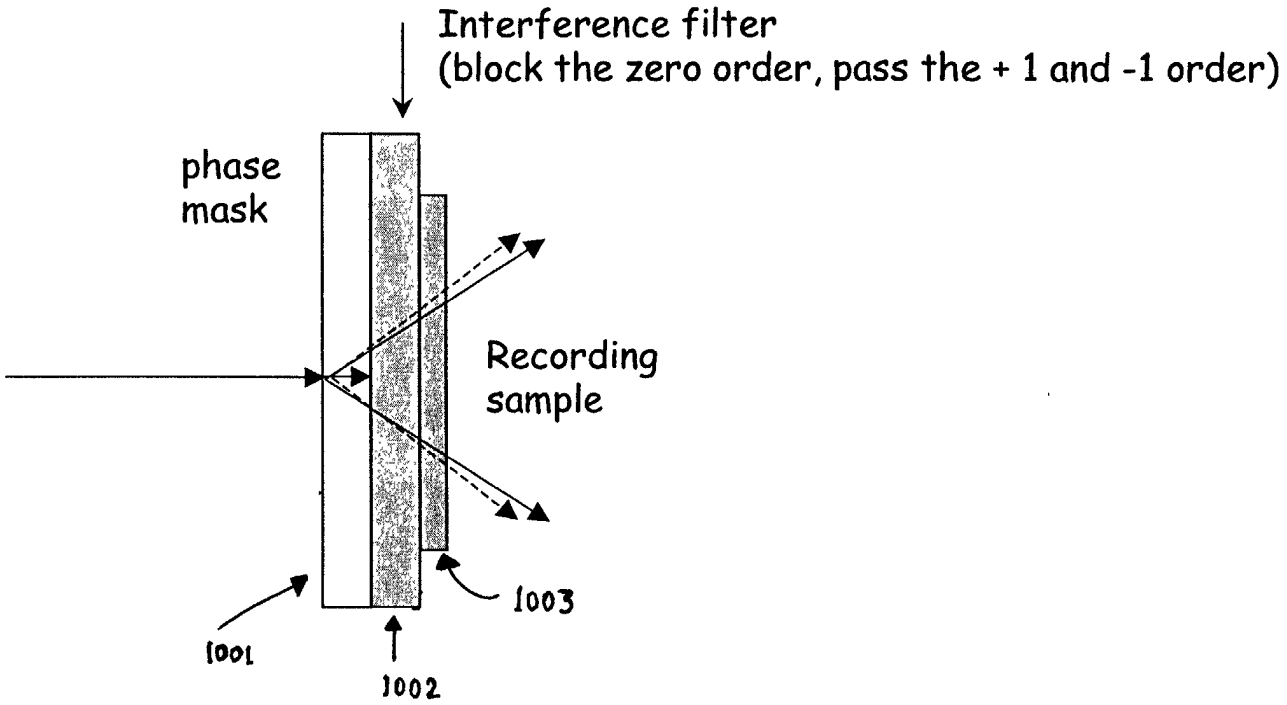
b



Far field recording

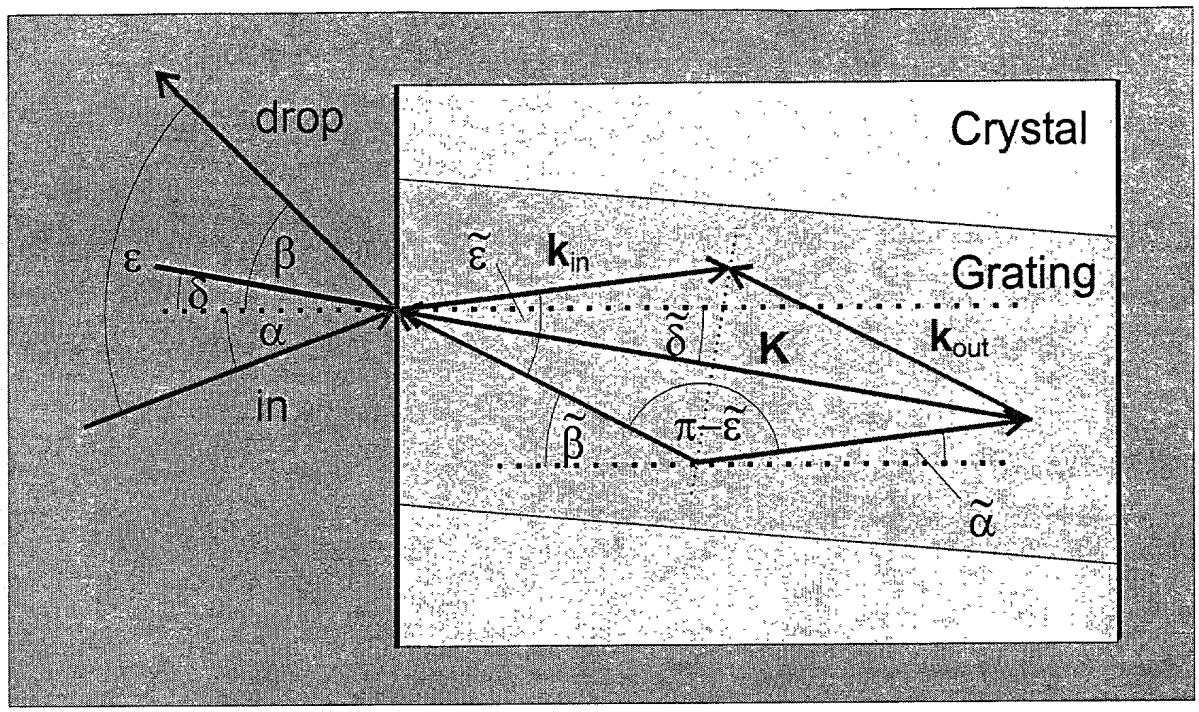
FIGURE 9

C



Near field recording

FIGURE 10



$\tilde{\alpha}$ = input beam in the crystal; α = input beam in air

$\tilde{\beta}$ = output beam in the crystal; β = output beam in air;

$\tilde{\varepsilon}$ = full angle between the read out beams in the crystal;

ε = full angle between the read out beams in air;

$\tilde{\delta}$ = slant angle of the grating vector in the crystal at room temperature;

$\tilde{\delta}^{H}$ = slant angle of the grating vector in the crystal at $180\ ^{\circ}C$;

δ = slant angle of the dual fiber collimator;

$\mathbf{K}$ = grating vector; $\mathbf{k}_{in}$ *and* $\mathbf{k}_{out}$ = wave vectors (in and out);

Λ_G = grating period of the refractive index pattern at room temperature;

Λ_G^H = grating period of the refractive index pattern at $180\ ^{\circ}C$;

Λ_P = grating period of the phase mask;

λ_R = read out wavelength

n_R = refractive index for infrared light

$a_z = 4.5 \cdot 10^{-6} K^{-1}$; $a_y = 1.5 \cdot 10^{-5} K^{-1}$; thermal expansion koefficients

$T_R = 25^{o}$ C, read out temperature; $T^{H}{}_{R} = 180^{o}$ C, recording temperature; $\Delta T = 155K$;

FIGURE 11

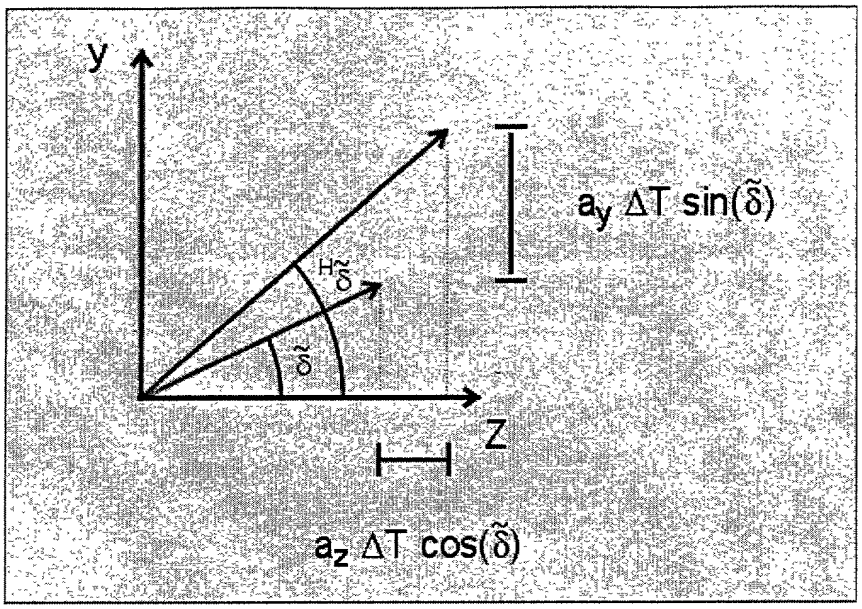

y
z
$a_y \Delta T \sin(\tilde{\delta})$
$a_z \Delta T \cos(\tilde{\delta})$
$H\tilde{\delta}$
$\tilde{\delta}$

FIGURE 12

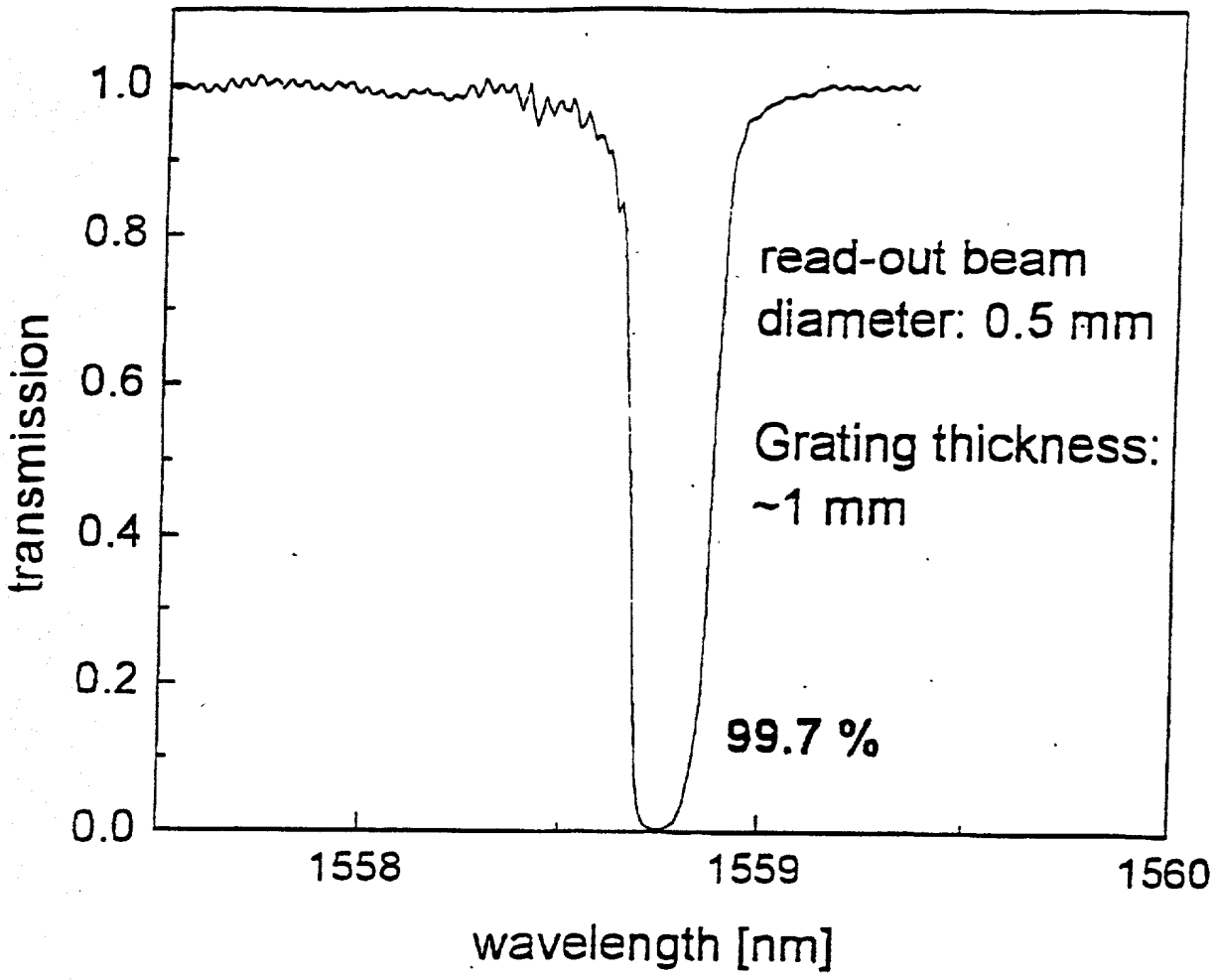

1.0
0.8
0.6
0.4
0.2
0.0
transmission
1558
1559
1560
wavelength [nm]
read-out beam
diameter: 0.5 mm
Grating thickness:
~1 mm
99.7 %

FIGURE 13

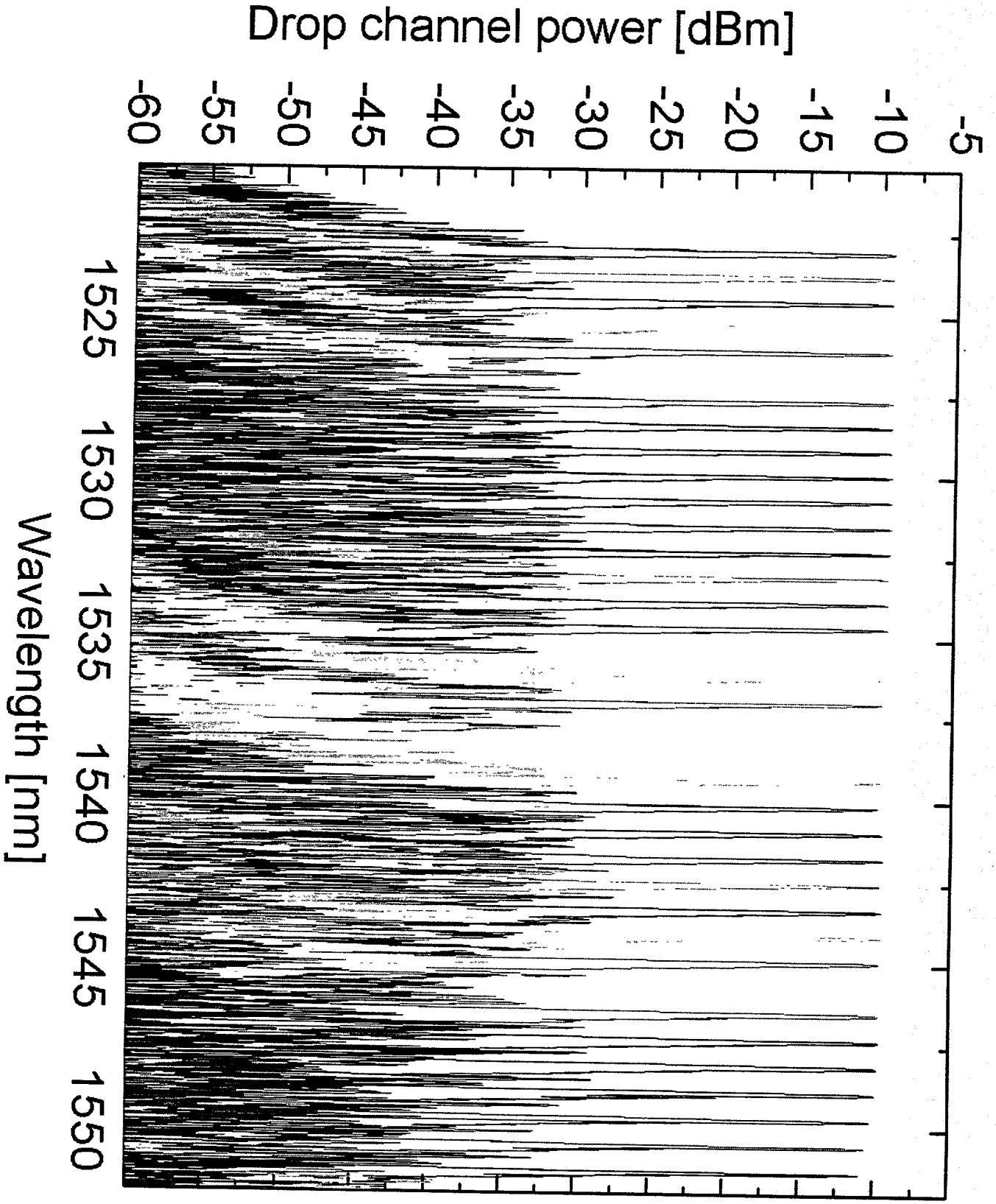

Drop channel power [dBm]
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
-55
-60
Wavelength [nm]
1525
1530
1535
1540
1545
1550

FIGURE 14